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ABSTRACT

This report summarizes the technical reports which were produced from a research program that focused on determining the complex interactions among job structural attributes, individual abilities, values and orientation, individual job performance and satisfaction, and organizational tenure related to monitoring and maintenance tasks. After reviewing the three integrated research approaches (field studies of Naval monitoring and maintenance personnel, laboratory simulations of monitoring and maintenance jobs, and an extensive literature review), a discussion is presented. It was found that those individuals with the most ability who would ordinarily be selected by an organization because of their anticipated superior job performance, were also the individuals who would derive the least satisfaction from the job and therefore would plan to leave the organization, unless an attempt were made to either place these individuals on jobs in which the intrinsic reward value is concomitant with their abilities and/or values, or redesign the job to fit their preferences for job structural attributes. Overall, the report concluded that more work is required in specifying the individual and job attributes which will meet both individual and organizational needs. (Author/TA)

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Technical Report 8

Final Report: Field and Laboratory Studies for Increasing the Intrinsic Reward Value in Navy Jobs and Careers

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University of Akron

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Final report of field and laboratory studies of monitoring and maintenance tasks conducted within the context of a conceptual framework integrating job structural attributes, individual abilities, values and orientation, job performance and satisfaction and organizational tenure.

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Introduction

This report summarizes the technical reports which were produced from the research program. The research focus was placed upon determining the complex interactions among job structural attributes, individual abilities, values and orientation, individual job performance and satisfaction, and organizational tenure. Both field and laboratory studies were conducted to explore these issues.

The research effort has involved three integrated approaches: (1) field studies of Naval monitoring and maintenance personnel, (2) laboratory simulations of monitoring and maintenance jobs and (3) an extensive review of the literature which was integrated and organized into an annotated bibliography. Each of these areas will be reviewed.

Field Studies [1]

Two field studies were conducted to investigate the dynamics of Naval turnover and gather preliminary information for concurrent laboratory investigations. The first of these studies involved 46 male non-supervisory Naval maintenance personnel and investigated the relationships among the Naval Test Battery, work values, job satisfaction and job structural attribute preferences as measured by a new research instrument, the Attribute Pref-

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[1] This section is based on Barrett, Bass, O'Connor, Alexander, Forbes and Cascio (Technical Report 3, 1975).

erence Scale/Attribute Description Scale (APS/ADS). This scale was specifically designed to measure workers preferences for job attributes and workers descriptions of their current jobs. Four attributes important for naval monitoring operations (responsibility, variety, independence and job complexity) and four attributes important for maintenance operations (variety, closure, independence and learning new skills) are measured by the APS/ADS. Construction, administration and scoring of the APS/ADS are detailed in Technical Report 3, (Barrett, Bass, O'Connor, Alexander, Forbes & Cascio, 1975).

The second field study consisted of 30 male Naval monitoring (sonar and radar operations) and electronics personnel. The second field study was conducted to determine the degree to which the pattern of relationships evident in the first investigation of maintenance personnel could be generalized to individuals working on monitoring tasks. This second study also sought to determine the relationships among the types of jobs preferred by monitoring incumbents, job satisfaction and the duration of their past and intended future Naval service. Principal consideration was given to the investigation of the correlates of both Naval retention and incumbents' satisfaction. Emphasis was also focused on clarifying the typical pattern of characteristics possessed by individuals who scored high on the Naval Test

Battery. Participants in the first field study completed the Job Descriptive Index (JDI), the Survey of Work Values (SWV) and the APS/ADS. All subjects in the second field study completed the JDI, SWV, APS/ADS, and the Biographical Information Blank (BIB), Maudsley Personality Inventory (MPI), and the Future Autobiography (FAB).

The results indicated that Naval retention was related to a number of individual variables and job structural attribute preferences and descriptions. Extended Naval tenure was associated with lower verbal and clerical aptitudes, (Naval Test Battery); higher levels of activity preference, pride in work, personal relations and satisfaction with supervision and the work itself and a belief that others shape and control one's future.

The field studies of monitoring personnel found a positive relationship between job satisfaction on four of the five JDI scales and Naval tenure. The fifth scale (pay) was not significantly related to future Naval service.

The field studies of Naval monitoring personnel strongly supported the positive relationship found in previous research between various job content factors and job satisfaction (Turner & Lawrence, 1965 and Hackman & Lawler, 1971). The ADS scales of variety and independence were both significantly related to satisfaction with the work itself as measured by

the JDI. Significant positive relationships were also found between satisfaction with supervision (JDI) and the responsibility and independence dimensions (ADS).

The APS/ADS format allows for a meaningful comparison of an individual's preferences for job structural attributes and how he describes his current job in terms of these attributes. Results of the field study found that Naval personnel who indicated a greater discrepancy between preferred and described job attributes characterized their current jobs in a less favorable manner. For both the independence and variety dimensions, significant negative relationships were found with work satisfaction indicating that those persons who see a greater incongruence between preferred and described job attributes are less satisfied with their work. In addition, over half the respondents perceived their jobs to have more responsibility and complexity than they preferred. These field studies have added a new dimension to previous research on the correlates of job satisfaction in the Navy environment (McDonald & Gunderson, 1974) by demonstrating the importance of job structural attributes to satisfaction.

In addition, the implicit assumption made by previous researchers that no relationship existed between ability measures and either work values or job structural attribute pref-

erence was not upheld. The strong relationship found between ability, work values and perceived discrepancies in some job structural attributes have implications for a wide range of job design programs.

Laboratory Studies: Monitoring Tasks[2]

Simulated visual monitoring tasks were developed. These simulations consisted of a basic signal detection task in which a subject had to identify relevant symbols from slides containing both irrelevant and relevant symbols. The experimental design consisted of two levels of task design. In the "basic" cell, subjects were given a task designed to consist of low levels of job complexity, variety, responsibility and external feedback-Low Job Structural Attributes (LJSA). In the "complex" cell, subjects were presented with a task of increased job complexity, variety, responsibility and external feedback-High Job Structural Attributes (HJSA).

The low level of job complexity and variety consisted of a task in which subjects were required to detect the presence and the movement of only one type of signal (a triangle). In the high level of complexity and variety there are three different types of relevant signals (triangles, circles and cloverleaves). Furthermore, the subjects were required to respond to different types of movement for each type of signal.

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[2]This section is based on Barrett, Forbes, Alexander, O'Connor and Balascoe (Technical Report 4, 1975).

The low level of responsibility was manipulated by instructing each subject that three other subjects were monitoring the same area and that it was only necessary for one subject to detect a signal for the system to operate properly. High responsibility was induced by instructions indicating that each subject was individually responsible for signal detection and operation of the system.

External feedback was manipulated by informing subjects in the LJSA condition that only group measures would be recorded precluding individual feedback. Subjects in the HJSA conditions were told that individual feedback would be given at the end of each session.

The subjects consisted of 60 undergraduate college students (both males and females) who worked on the simulated monitoring task for three consecutive one hour vigils. Subjects completed a test battery designed to measure general and specific abilities as well as personality variables, work satisfaction, motivation and preferences for job attributes. After completion of the experimental monitoring task, the subjects completed post measures of job perception and job satisfaction.

The results indicated as predicted, that response time was longer and there were significantly more errors in the HJSA condition than the LJSA condition. This study added support to

the strong empirical evidence that has accumulated indicating that perceptual style relates to performance on a variety of simulated and real world tasks in which monitoring is an essential component, (Barrett & Thornton, 1968; Barrett, Thornton & Cabe, 1969; Cahoon, 1970; Harano, 1970; Moore & Gross, 1973; and Moses, 1970).

The results of this study indicated a strong positive relationship between perceptual style and job performance and a negative relationship between perceptual style and work satisfaction. This indicates that those individuals with the most specific ability for performing the monitoring task derived the least satisfaction from it. These results are compatible with the field study of Naval monitoring personnel which found a high negative correlation between general and specific ability measures and work satisfaction.

Task characteristics moderated the relationship between ability and personality variables, work orientation, job attribute preferences and descriptions, satisfaction and performance. In the HJSA conditions there was a consistent relationship between the description of the job attributes and satisfaction received in performing the tasks. This was not true in the low condition.

The possibility that task complexity is a crucial variable in the relationship between individual attributes, task per-

formance and satisfaction was indicated by the finding that when ability was partialled cut certain motivational factors were related to job performance in the LJSA condition only.

In conclusion, the laboratory studies of simulated monitoring tasks have demonstrated the strong effect of individual attributes upon performance and satisfaction, and the complex interactions between these individual and job structural attributes.

Laboratory Studies: Maintenance Task[3]

A simulated maintenance task was developed in which experimental subjects had to locate malfunctioning components in the form of incorrectly punched computer cards in a series of computer card decks. The experimental design consisted of two levels of psychologically manipulated job structural attributes. In the low job structural attribute condition (LJSA) subjects were instructed that the task consisted of a low level of responsibility, feedback and opportunity to learn new skills. In the high job structural attribute condition (HJSA) subjects were told that the task was high on these attributes. Responsibility was manipulated by informing the subjects in the HJSA condition that they were individually responsible for the repair of malfunctions. In the LJSA condition subjects were told they would be able to

[3]This section is based on Barrett, O'Connor, Alexander, Forbes and Balascoe (Technical Report 5, 1975).

correct malfunctions in only a portion of the total equipment deck, therefore, making them only partially accountable. Students in the HJSA condition were told that they would be given feedback on the quality and quantity of their performance while subjects in the LJSA condition were told that feedback could not be given. Subjects in the HJSA condition were told that the maintenance task provided a unique opportunity to learn a valuable systematic approach to problem solving. Subjects in the LJSA condition were informed that the task was routine and repetitive in nature. It should be emphasized that responsibility, feedback and learning new skills were manipulated psychologically as all subjects completed the same physical tasks during the experimental session.

The subjects consisted of 60 undergraduate students (both males and females) divided equally into either the HJSA condition or LJSA conditions. Subjects completed a test battery designed to measure general and specific abilities, personality variables, work orientation, motivation and preferences for job attributes. After completion of the experimental task, subjects completed measures of job perception and job satisfaction.

After training to insure that subjects had achieved a minimum understanding of the task instructions, the subjects worked at their own rate of speed for three consecutive hours on

the simulated maintenance task.

The results indicated that the structural attributes of responsibility, feedback and learning were successfully manipulated in the HJSA and LJSA condition as significant differences were indicated on two post measures of job perception.

Intellectual ability was found to be strongly but differentially, related to performance across experimental conditions on this simulated maintenance task. Intelligence was positively related to quantity of performance in the LJSA condition and to quality of performance in the HJSA condition. It is possible that these results may be a function of the differential value placed on the quality or quantity aspects of performance by the subjects. Subjects in the LJSA with higher ability may have concentrated their effort on speed while subjects in the HJSA condition, who were faced with the prospect of feedback, concentrated on quality rather than speed.

Cognitive style was also differentially related to performance across conditions. Field independent subjects performed better in terms of quantity of production in the LJSA condition while this pattern was reversed in the high condition. It is hypothesized that this reversal may be a function of differences in suggestibility and conformity between field independent and dependent subjects. Field independent subjects may not

have been convinced by the psychological manipulation embedded with the experimental instructions.

Described job structural attributes were found to be related to performance and satisfaction outcomes. The greater the amount of attributes assigned to the task the higher the satisfaction. Moreover, the smaller the difference between the described and preferred dimensions of job attributes, the higher the satisfaction. It was also found that dividing the subjects on the basis of described job structural attributes moderated the relationships between ability and performance. Carlson's finding that the ability-performance relationship was stronger for satisfied individuals was replicated in the present study (Carlson, Dawis, & Weiss, 1969).

This study demonstrates the strong effect expectancy can have upon the relationships between ability measures and job performance. The findings reinforce the results from a recent field study (King, 1974) that the beliefs of the incumbents concerning the attributes of a job they are performing may be more important than the physical task itself.

Integration of Research Literature [4]

In the last ten years there has been increased public and professional concern regarding the quality of work life and the consequences of job design for the individual, the organization and society in general. This concern has been accompanied by a massive outpouring of theoretical and action research designed to attack the problem. An ever increasing body of literature has been produced by these concerns and is scattered in a variety of references and sources: journals, government documents and reports, symposium proceedings, newspapers and magazines. A number of different disciplines have been engaged in both research and applications. These include Psychology, Sociology, Engineering, Economics, Political Science, Business and Management. This probably accounts for the large number of diverse concepts, theories, operational definitions and measuring instruments applied to the same set of problems. A need was seen to attempt to draw together some of the literature in one place to provide an index for practitioners and researchers from a number of disciplines and a variety of academic and professional settings. The research literature was reviewed, abstracted and organized into an annotated bibliography. The

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[4] This section is based on Barrett, Dambrot and Smith (Technical Report 6, 1975); Barrett and Dambrot (Technical Report 2, 1975); and Alexander, Balascoe, Barrett, O'Connor and Forbes (Technical Report 7, 1975).

bibliography contains narrative overviews of the literature, reference tables, abstracts of research articles, and a glossary of terms. The research literature was divided into the following six convenient, but not all inclusive categories: (1) Quality of Work Life and Theoretical Basis of the Job Design Movement, (2) Job Enrichment Movement, (3) Job Design in General, and Automation, (4) Organizational Structure and Climate, (5) Effect of Individual and Group Variables on Attitudinal and Performance Outcomes and (6) Research Methodology and Test Development.

The following conclusions were drawn from this review of the literature. There are a diversity of viewpoints and conflicting results regarding the quality of work life and the current state of either well-being or alienation of the American worker. Studies and reviews have failed to consider broad economic issues and individual differences among workers. Theoretically the field of job design and job restructuring have been characterized by diversity and a lack of a clear theoretical orientation. The simplicity of two-factor theory has lead researchers and practitioners to follow courses of action that neglect the wide range of variation in human motivation. Job enrichment and work restructuring programs represent a bold effort of twenty years duration to improve the quality of work life. Pilot projects have been generally successful yet slow

to diffuse and somewhat oblivious to the wide variety and unique character of individual workers.

In the area of job design and task taxonomy, attempts at task classification description and definitions have just begun to progress to the point of generalization across tasks and individuals. A meeting of research contractors in the area (Barrett & Dambrot, 1975) indicated initial progress in this area.

Past research efforts have been characterized by difficulty in the operational definition and measurement of constructs and variables. An example of this problem is the relationship between the various measures of intrinsic-extrinsic work orientation. Three common measures of intrinsic-extrinsic orientation are the Job Attitude Scale (Saleh, 1971), the Survey of Work Values (Wollack, Goodale, Wijting & Smith, 1971) and the Job Orientation Inventory (Flood, 1969, 1973). Although all of the above instruments purport to measure intrinsic and extrinsic orientation each is based on a different conceptual and theoretical model. A recent study (Alexander, Balascoe, Barrett, O'Connor & Forbes, 1975) indicated that these three measures were not conceptually equivalent. Convergent validity was not established for the three measures of intrinsic-extrinsic orientation and it was found that perhaps a substantial portion

of the variance across the three instruments could be attributable to the measuring instruments. These results point to serious problems in the current measurement of work orientation.

Little consideration has been given to the possible relation between preference for job structural attributes and individual differences in abilities and values. In a field study involving 30 technical personnel, it was determined that changes in job attributes would have more effect on the satisfaction of field independent individuals (Barrett, Cabe, Thornton, & O'Connor, in press). Similar results were obtained from participants in laboratory studies. For example, for over 100 subjects, more field independent individuals preferred more variety and internal feedback in their jobs. General intellectual ability was also related to preferences for job structural attributes. Preference for job complexity, internal feedback and variety were positively related to intellectual ability. For other job structural attributes, value orientations were related to attributes such as preferred responsibility in a job.

From both field and laboratory investigations, it is clear that preference in job structural attributes are related to both abilities and values.

A review of the research literature indicated the need for common measures of relevant variables with wide generalization

across tasks and individuals. In addition, the full range of complex interactions between the individual, the task and the organization need to be explored from a total system perspective.

Discussion

The development of two instruments, the Attribute Preference/Attribute Description and Work Itself/Work Environment Questionnaire, to measure job structural attributes proved to be sensitive measures in both field and laboratory investigations.

Preferences for job structural attributes were significantly related to both abilities and values in laboratory and field studies.

The discrepancies between described and preferred job structural attributes were also predictive of work satisfaction, performance, and organizational tenure. The approach of developing job structural attributes germane to the job and directly determining discrepancies between preferred and described attributes for purposes of prediction appears to be at least as promising as alternative conceptualizations.

Hackman and Lawler (1971) advocate four core job dimensions with predictions of job behavior and satisfaction modera[illegible] need strength. In general, the approach of this series of studies resulted in higher predicted relationships without the necessity for moderation by need strength. This is important

since the need strength moderator has not always been found to be useful (Lawler, Hackman, & Kaufman, 1973).

A job contains both physical attributes and expectations concerning those physical attributes. One laboratory study (maintenance) was successful in having participants in one group describe the job structural attributes significantly different from a second group even though the tasks were physically identical. This manipulation also demonstrated that these expectations would moderate the relationships between ability and performance. The second laboratory study (monitoring) modified both the physical task and expectations. The general and specific ability measures were highly positively related to performance but negatively related to work satisfaction. These findings from a laboratory simulation are analogous to the findings from the field.

In effect, those individuals with the most ability who would ordinarily be selected by an organization because of their anticipated superior job performance are also the individuals who derive the least satisfaction from the job and therefore will plan to leave the organization.

A simple model implied by this extended research indicates that individuals general and specific abilities and values affect their preferences and description of job structural at-

tributes which in turn are related to satisfaction and tenure. Therefore, if an organization continues to select-in individuals with the most ability it appears an attempt must be made to either place these individuals on jobs in which the intrinsic reward value is concomitant with their abilities and/or values or redesign the job to fit their preferences for job structural attributes in order to increase job satisfaction and decrease turnover.

The complex interactions among abilities, job structural attributes, values, job performance, satisfaction and organizational tenure are just beginning to be understood. More work is required in specifying the individual and job attributes which will meet both individual and organizational goals.

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